

Amendment to the Abstract

Please AMEND the Abstract of the Disclosure in the instant application to read as follows:

ABSTRACT OF THE DISCLOSURE

~~Carrier signals are modulated by information (e.g., television) signals in a particular frequency range~~ Digital signal processing for television signals includes digital feedback loops. ~~The~~ Analog information signals are oversampled at a first frequency greater than any of the frequencies in the particular frequency range to provide digital signals at a second frequency. The digital signals are introduced to a digital carrier recovery loop which provides a feedback to regulate the frequency of the digital signals at the second frequency. The digital signals are introduced to and a digital symbol recovery loop which provides a feedback to maintain the time for the production of the digital signals in the middle of the data signals. The gain of the digital signals is also regulated in a feedback loop. The digital signals ~~re~~ are processed to recover the data in the data signals. ~~By providing~~ The use of digital feedbacks, ~~the~~ feedback loops allows information recovered from the digital signals ~~can~~ to be quite precise. ~~In one embodiment, the carrier~~ Carrier signals ~~are~~ can be directly demodulated to produce baseband inphase and quadrature signals, ~~or~~. The inphase and quadrature signals are then oversampled and regulated in the feedback loops as described above. ~~In a second embodiment, the carrier signals~~ first downconverted to produce intermediate frequency signals ~~which are oversampled to produce the digital signals at the second frequency without producing the inphase and quadrature signals. The oversampled signals are then regulated in the feedback loops as described above. In a third embodiment, the carrier signals are oversampled without being downconverted and without producing the inphase and quadrature signals.~~

Attachment: Clean Version of the Replacement Abstract of the Disclosure

Attorney Docket No.: 2875.0150002

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 2-5, 12, 17-18 and 22-23 are pending in the application. Claims 2, 12, and 17 are independent claims. Claims 6-11, 13-16, 19, 20-21 and 24-38 are sought to be cancelled without prejudice to or disclaimer of the subject matter therein. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

The Inventions

This application is a continuation of parent application 09/013,964, now issued as US Patent 6,714,608. The issued patent contains only apparatus claims. This application was filed at least in part for the purpose of obtaining method claim protection as well. Some of the method claims introduced by preliminary amendment have been cancelled. Others have been amended.

The following general description of the inventions is intended only to help the Examiner focus on some key concepts of the inventions. The inventions are not limited to these concepts.

Three embodiments of a satellite signal receiver are set forth in our application Figures 2, 3 and 4, respectively. A common feature of the three embodiments is that all signal processing after any initial down-conversion (analog) is carried out digitally. Each of the dashed line blocks (reference numeral 64 in Figure 2 and corresponding dashed boxes in Figures 3 and 4) represent a digital integrated circuit chip that carries out all signal processing functions after any initial down-conversion.

The digital integrated circuit has two distinct digital feedback loops. The first of these two digital feedback loops is shown in Figure A and the second is shown in Figure B. Figures A and B are portions of our patent application Figure 2 with annotating arrows.

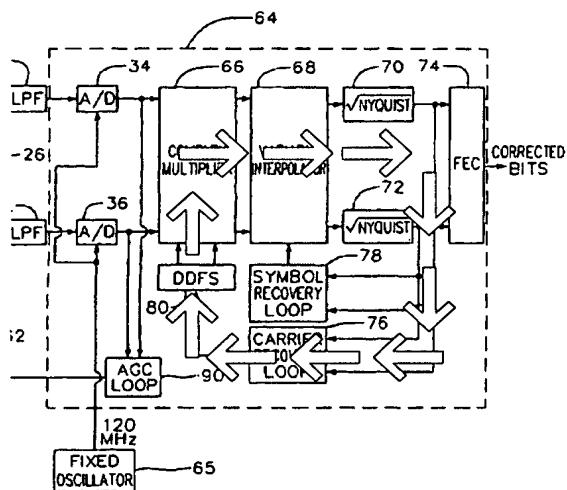


Figure A – first digital feedback loop

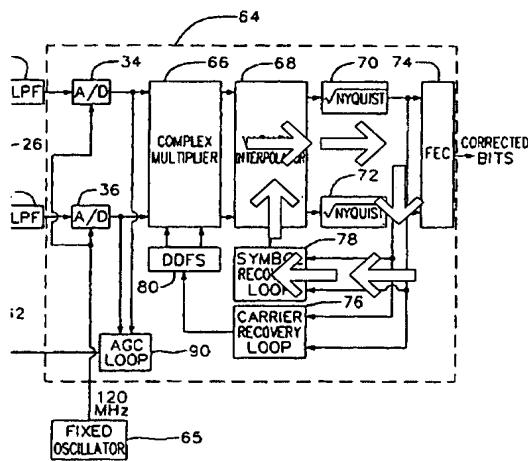


Figure B – second digital feedback loop

The first and second digital feedback loops overlap in their sharing of the interpolator. The first digital feedback loop carries out carrier recovery and the second digital feedback loop carries out symbol recovery. These two digital feedback loops are able to operate over a wider bandwidth than prior analog circuits performing those functions. One advantage of this increased bandwidth is that it allows for the use of fixed oscillators (rather than require precisely feedback controlled oscillators) as oscillators 62, 65, 102, 110 and 122.

Objection to the Drawings

The undersigned agrees with the Examiner that different reference numerals were used to represent corresponding parts in the various embodiments. This was apparently done because the parts with different reference numerals, although similar in function, may not be necessarily identical. The patent drawing rules do not require that identical reference

numerals be used in different embodiments even if elements are corresponding. However, if, upon further reflection, the Examiner wants the reference numerals to be made identical, the undersigned will comply and submit replacement drawing sheets and amend the specification as needed for consistency.

Objection to the Specification

The Abstract of the Disclosure has been rewritten and various amendments made to the specification to correct the formality points raised by the Examiner.

Rejections under 35 U.S.C. § 102

Claims 32, 33, 35 and 38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ishikawa (U.S. Patent No. 5,418,815 A), hereinafter "Ishikawa." These claims have been cancelled. It is also believed that independent claims 2, 12 and 17, as amended, are patentably distinct over the Ishakawa reference at least because Ishikawa does not teach the use of first and second digital feedback loops as required by all three of the independent claims as amended herein.

All three independent claims require fully digital processing including, for example, as set forth in the following excerpt from claim 2:

"processing, using a digital integrated circuit, the modulated carrier signal to generate an output signal representing the information, the digital processing including...

...regulating by a first digital feedback loop a frequency at which the output signal is generated, the first feedback loop carrying out processes of complex multiplication, variable interpolation, carrier recovery and digital frequency synthesizing to generate multiplying signals for the complex multiplication, and

regulating, by a second digital feedback loop, a sampling time associated with the output signal, the second

digital feedback loop carrying out processes of variable interpolation, and a symbol recovery, the processes of carrier recovery and symbol recovery both receiving signals resulting from variable interpolation."

Ishikawa does not teach the combinations expressed by independent claims 2, 12 and 17 at least because it does not teach the first and second digital feedback loops as in the above-quoted portion of claim 2.

Rejections under 35 U.S.C. § 103

Claims 2-6, 9, 12, 13, 15, 17, 19, 21-23 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Inkol (U.S. Patent No. 5,504,455 A), hereinafter "Inkol." Claim 37 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa in view of Inkol.

As amended, independent claims 2, 12 and 17 are believed to define inventions that are not suggested by the combined teachings of Ishikawa and Inkol. It is therefore respectfully requested that all of the rejections based on the combined teachings of Ishikawa and Inkol be withdrawn. Because all three independent claims are thought to patentably define over the combined teachings of Ishikawa and Inkol, all of the 35 U.S.C. § 103(a) rejections based on Ishikawa and Inkol are dealt with together.

All three independent claims require fully digital processing including, for example, as set forth in the following excerpt from claim 2:

"processing, using a digital integrated circuit, the modulated carrier signal to generate an output signal representing the information, the digital processing including...

...regulating by a first digital feedback loop a frequency at which the output signal is generated, the first feedback loop carrying out processes of complex multiplication, variable interpolation, carrier recovery and digital frequency

synthesizing to generate multiplying signals for the complex multiplication, and

regulating, by a second digital feedback loop, a sampling time associated with the output signal, the second digital feedback loop carrying out processes of variable interpolation, and a symbol recovery, the processes of carrier recovery and symbol recovery both receiving signals resulting from variable interpolation."

Without admitting the appropriateness of combining the teachings of these references, even if combined, they do not render any of claims 2, 12 and 17 obvious at least because neither Ishikawa nor Inkol taken alone nor their combined teachings suggest the use of first and second digital feedback loops as required by amended independent claims 2, 12 and 17 as in the above-quoted portion of claim 2.

The Examiner relied upon Inkol to fill in various teachings missing from Ishikawa. For example, Inkol's use of a fixed oscillator, Inkol's use of subsampling, and Inkol's use of downconverting. However, one can't simply pick and choose individual elements from a secondary reference and simply "plug" them into the system of the primary reference. Doing so does not cause Ishikawa to operate in the manner required by independent claims 2, 12 and 17. There is still no teaching, for example, of the first and second digital feedback loops functioning as required by these claims. For example, carrying out carrier recovery and symbol recovery.

Claims 24-27 and 29-31 were rejected under 35 U.S.C § 103(a) as being unpatentable over Ishikawa in view of Becker (U.S. Patent No. 5, 504,785), hereinafter "Becker." Claims 34 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa as applied to Claim 32 above, and further in view of Becker. Claims 7, 8, 10, 11, 14, 16, 18 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishikawa and Inkol as applied to Claim 2 above, and further in view of Becker. Claim 28 was also rejected under

35 U.S.C. § 103(a) as being unpatentable over Ishikawa and Becker as applied to Claim 24 above, and further in view of Inkol.

Because of the amendments to all of the independent claims these rejections will be dealt with together. All three independent claims require fully digital processing including (as forth in the following excerpt from claim 2):

"processing, using a digital integrated circuit, the modulated carrier signal to generate an output signal representing the information, the digital processing including...

...regulating by a first digital feedback loop a frequency at which the output signal is generated, the first feedback loop carrying out processes of complex multiplication, variable interpolation, carrier recovery and digital frequency synthesizing to generate multiplying signals for the complex multiplication, and

regulating, by a second digital feedback loop, a sampling time associated with the output signal, the second digital feedback loop carrying out processes of variable interpolation, and a symbol recovery, the processes of carrier recovery and symbol recovery both receiving signals resulting from variable interpolation."

Neither the combined teachings of Ishikawa and Becker nor the combined teachings of Ishikawa, Inkol and Becker render any of the three independent claims unpatentable at least because none of the references teach or even suggest the use of first and second digital feedback loops as required by all three independent claims.

Becker admittedly teaches an interpolation technique. In fact, there are many interpolation techniques. Again the Examiner has selected one feature from column A and another from column B. Attempting to add interpolation from Becker into the Ishikawa arrangement does not produce the dual digital feedback loops now required by all three independent claims. For example, none of the three references suggest sharing the

interpolator in a manner defining two digital feedback loops as required by all three independent claims.

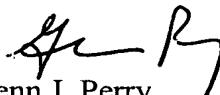
Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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